

Future Role of Neurologists

JOHN W. ENGSTROM, MD, and STEPHEN L. HAUSER, MD, *San Francisco, California*

Clinical neurologists in the health care system of the future should have a multifaceted role. Advances in the basic understanding of the nervous system and therapeutics of neurologic disease have created, for the first time in human history, an ethical imperative to correctly diagnose neurologic disease. In many situations, the neurologist may function as a consultant and principal physician for patients with primary nervous system disorders including Parkinson's disease, multiple sclerosis, Alzheimer's disease, epilepsy, migraine, cerebrovascular disease, movement disorders, and neuromuscular disease. Other important roles for neurologists include the training of future physicians, both neurologists and primary care physicians, the application of cost-effective approaches to care, and the support of health care delivery research and academic programs that link basic research efforts to the development of new therapy. To be successful, future residency training programs should include joint certification opportunities in both neurology and general medicine, and training programs for clinical investigators should be expanded. Despite its threats to specialists, managed care should also provide opportunities for new alliances among neurologists, other specialists, and primary care physicians that will both improve patient care and increase efficiency and cost-effectiveness.

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Diseases of the nervous system occupy a prominent place among medical illnesses in terms of their frequency and the emotional burden they place on patients and their families. The enormous financial cost of neurologic diseases—estimated in 1992 at more than \$400 billion in the United States—reflects the profound effect these disorders have on society.¹ With the aging of the population and the increasing longevity of persons with cancer, heart disease, and other disorders, the number of patients with neurologic disease will further increase in coming years.² New and effective treatments, available now or in the near future, will add additional pressure on the medical community to diagnose and treat neurologic diseases efficiently.

The neurologic method, consisting of diagnosis by careful neuroanatomic localization of symptoms and signs, is most effectively applied by experienced practitioners. Skillful application of the method requires, for all but the few most capable, frequent repetition. The blind application of neuroimaging and other diagnostic testing methods will not compensate for deficient skills in clinical neurologic assessment and will add substantially to the cost of care. As a result, it is not surprising that many physicians are uncomfortable in evaluating neurologic problems.

These considerations might translate into self-confidence among neurologists and optimism over the future of the specialty.³ There should be a growing demand for neurologists, who currently represent only 1.5% of all

physicians and whose clinical ranks are reduced by 10% of neurologists, compared with 3% of physicians at large, who are primarily or exclusively engaged in biomedical research.¹ And yet, some well-intentioned assessments of health care needs tell us that there is a gross oversupply of neurologists and that we need to reduce their numbers dramatically, perhaps by twofold to threefold.^{4,5} Some successful managed care programs employ a few neurologists who serve limited and clearly defined roles in their systems. Canada is currently training six neurologists a year nationwide, a tenth per capita of the number accepted each year in US training programs. Regardless of which supply estimates are correct, a fundamental change in the nature of patient care provided by neurologists is likely to occur. One cannot assume, without proper planning, that these changes will necessarily result in improved or more effective patient care. Any conclusions regarding the need for neurologists are dependent on the assumptions used to define the future role for neurologists within the health care system.

Societal Needs and Public Policy

Public policy aimed at reducing the number of specialists in clinical medicine is being driven by concerns over the cost and accessibility of medical care. Neurology will be affected by the anticipated reduction in the number of specialists and must evolve within the new health care environment.⁶⁻⁸

The future role of specialists will be determined by the broad needs of patients and society.^{9,10} Patients' needs include improving clinical results by reducing mortality and increasing the quality of patients' lives.¹¹ The needs of society include reducing the cost of medical care and developing improved methods for preventing and treating disease. These goals will require a commitment of resources for four purposes:

- Cost-effective methods of health care delivery must be developed and implemented;
- Residents in neurology and in primary care must be trained to apply cost-effective approaches to the use of diagnostic technology and therapy;
- Academic programs must support and train physician investigators expert in designing and implementing clinical research relevant to health care delivery; and
- Comprehensive academic programs that link basic research efforts to the clinical care of patients must be protected to foster the continued application of new knowledge to the development of cost-effective prevention and therapy.¹²

Our discussion of the future role for neurologists incorporates these considerations and addresses several questions: Should neurologists function exclusively as consultants? Is there a role for neurologists as providers of primary or principal care? What type of neurologic training should be available to primary care residents and physicians in practice? Are outcome data available to support an increased use of neurologists in the health care system? How many neurologists are needed to deliver quality health care? The answer to the last question depends on many factors, including a description of the range of tasks done by neurologists and evidence that neurologists make a difference in the diagnosis and management of neurologic disease.

Neurologist-Consultants

The traditional role of neurologists has been to provide consultative clinical services to patients and referring physicians. Three developments have changed this traditional role. First, dramatic advances in our understanding of the pathogenesis of many common neurologic diseases have been coupled with the development of new (and expensive) diagnostic methods. Second, therapies for neurologic disorders such as epilepsy, stroke, multiple sclerosis, headache and other chronic pain syndromes, Parkinson's disease, and neuromuscular disorders have increased in number and effectiveness. These two developments have created, as never before, an ethical imperative to correctly diagnose neurologic diseases. Third, the emergence of neurology as an independent specialty that treats patients with neurologic problems has isolated primary care residency trainees from adequate exposure to neurologic problems. These developments have resulted in a greater role for clinical neurologists and a reduced role for primary care physicians in the care of patients with neurologic disease.

Neurologic care is neither primary care nor solely spe-

cialty care. Neurologists currently function as the principal physician for many patients with long-term neurologic illness. Principal care refers to patient care provided by a specialist for a patient's principal medical illness or set of related problems.¹³ Principal care is not primary care. Examples of neurologic disorders for which neurologists may provide principal care are Parkinson's disease, multiple sclerosis, Alzheimer's disease, epilepsy, migraine, cerebrovascular disease, movement disorders, and neuromuscular disease. The role of the neurologist as a principal care provider does not diminish the role of the primary care provider. The role of the physician who provides a patient's primary care does not diminish the role of the neurologist. In fact, there is a great need for primary care physicians and neurologists to work together, both in the care of patients and the education of future physicians.

Neurologic Training for Primary Care Physicians

As of this writing, many managed care systems have assigned substantial clinical responsibility for the care of neurologic patients to primary care physicians. How might neurologic instruction of generalists-in-training or practicing primary care physicians be accomplished?¹⁴ The five components needed to establish an effective training program are faculty, primary care residents, an ambulatory care training facility, resource support for a new educational program, and a commitment to investigating the cost-effectiveness of diagnostic and therapeutic interventions.

There will be a central role in the future for physicians dually trained in primary care and neurology to teach and provide patient care and to serve as role models for neurology and primary care residents.¹⁵ These specialists, trained in internal medicine or pediatrics as well as neurology, will function comfortably as both consultants and principal physicians. Some of these physicians will also be trained in modern methods of epidemiology, biostatistics, public health, or clinical trials design. Such physicians are currently in short supply and high demand. Many have trained in a haphazard or inefficient way, in contrast to the well-organized training programs that characterize the education of most laboratory-based physician-scientists. Comprehensive training programs specifically designed to provide these skills must be developed, improved, or expanded in size. These clinical investigators, equipped with modern tools for clinical research, will be uniquely positioned to obtain grant support and to lead academic clinical programs. They will be among the most valuable assets of a competitive program, and this career path should prove to be increasingly attractive to future generations of academicians.

Expanding joint certification programs in neurology and a primary care specialty will help to encourage this career path. Joint certification already exists for pediatrics and child neurology and could be formalized also for internal medicine and adult neurology. Joint certification programs can provide medical students and residents with

important role models that foster effective teamwork between primary care and neurology physicians. The greatest challenges to implementing these proposed changes are the financial costs of implementation and the barriers that have traditionally segregated patients by diagnosis and along hospital departmental lines.

Outcome Data and the Role of Neurologists

There are specific circumstances in which the use of neurologists positively affects the outcome of neurologic therapy or the cost-effective use of diagnostic technology. Although mortality end points provide the most specific measures of therapeutic success or failure, neurologic diseases frequently result in long-term disability and lowered quality of life rather than death. The quality of life can be difficult to measure, but specific interventions that rely on the unusual skills of a clinical program or a person can be measured and expressed as a therapeutic or diagnostic outcome.

The beneficial results of a surgical procedure to alleviate the seizures of a patient with intractable epilepsy provide evidence of the effectiveness of clinical programs made up of neurologists.¹⁶⁻¹⁸ The most successful epilepsy surgery programs carefully select the patients most likely to benefit from surgical intervention based on features such as evidence of previous maximal medical therapy, localization of a seizure focus, the extent to which seizures impair the lifestyle of a patient, a pathologic substrate for seizures, and the likelihood of postoperative complications. Approximately 50% to 70% of properly selected patients with temporal lobe epilepsy are free of seizures after the surgical procedure. The resulting economic and medical care savings over the lifetime of a patient are likely to be substantial. Outcome data for different epilepsy surgery programs can be compared to determine which centers might be designated as "centers of excellence" in a new health care system. Outcome data are also available to support the benefits of specialized stroke units and intensive neurorehabilitation.¹⁹⁻²⁵

A similar analysis can be used to evaluate the cost-effective application of neuroimaging.^{26,27} For example, the cost of a magnetic resonance imaging (MRI) scan of the brain is about six times the cost of an initial history and examination by a neurologist. The number of neuroimaging procedures ordered by primary care physicians is increasing rapidly. Some studies suggest that primary care physicians may not order neuroimaging studies in a cost-effective manner. If the use of brain MRI can be reduced by one of every five scan requests, then a screening neurologic history and physical examination will be cost effective. Reducing the number of MRI scans could probably be achieved with little or no adverse effect on public health.

Any algorithm or practice guideline for the diagnostic evaluation of a neurologic symptom or sign will assume that a competent neurologic history and examination have been done. In a practical sense, "gatekeeping" for neuroimaging procedures should rest exclusively in the hands

of physicians who possess these clinical skills. In addition to neuroimaging, many other important questions regarding the appropriate use of diagnostic technology applied to patients with neurologic disorders are worthy of investigation.

These guidelines and measures may be of secondary importance for some. Neurologists must work with consumer groups to foster the development of clinical practice guidelines that balance quality of care with cost of care. In a survey from 102 managed care organizations, six factors were ranked for their importance to the success of managed care (R. Winslow, "In Health Care, Low Cost Beats High Quality," *The Wall Street Journal*, January 18, 1994, p 1B). The percentage of managed care organizations that ranked each factor either first or second in importance were as follows: price, 69%; patient satisfaction, 50%; access to physicians, 31%; quality improvement processes, 20%; national network affiliation, 11%; use of clinical practice guidelines, 10%; and publishing results, 9%. Clinical practice guidelines and publication of outcome measures were perceived as less important factors influencing the success of managed care. A strong voice for quality-of-care standards as measured by patient outcomes and standardized by clinical practice guidelines needs to be encouraged among consumer groups and health care professionals.²⁸

How Many Neurologists Are Needed?

Considerable disagreement exists about the number of neurologists required to serve the needs of society and patients. The source of disagreement is buried among the assumptions used to project neurologic personnel needs. For example, early reports suggesting that the supply of neurologists was outstripping need were based on several assumptions. First, the dramatic growth rate in the number of neurology residents during the 1970s was expected to continue. In fact, the number of neurologists completing residency training annually reached a plateau in the late 1970s.²⁹ Primary care residents were expected to receive more clinical neurology training in the future. Menken predicted in 1981, "As more primary care physicians graduate from programs with greater emphasis on diagnosis and treatment of neurologic illness, the total demand for neurologic consultations will be less."^{30(p2402)} He clearly recognized the requirement that primary care physicians develop adequate skills in neurologic assessment to decrease the demand for neurologic consultants. During the past decade, however, the formal neurologic training of primary care physicians appears to have decreased rather than increased. It thus appears that the education of primary care physicians may conflict with assumptions of managed care and threaten the level of care for patients with neurologic disease.

An accurate projection of neurology personnel needs has been limited also by the failure to recognize the effect of the growing number of older Americans.² The number of adults older than 85 years will approximately double from 1980 to 2020. Currently, 15% of men and 25% of women older than 85 years require nursing home place-

ment because of illness and disability. The prevalence of dementia reaches 28% at age 85 years and older. The demand of these senior citizens for neurologic services in the future will be considerable.

Recent estimates of the need for neurologists have ranged from a low of 5,000 to a high of 16,000.^{5,7} The current "supply" is about 13,000. The disparity between high and low estimates of need reflects multiple uncertainties. The future role of the neurologist is not defined clearly. The number of neurologists per capita differs by about a factor of 10 in different regions of the United States, from a low of 1 per 100,000 in Wyoming to a high of 11 per 100,000 in the District of Columbia.⁷ These dramatic differences suggest that neurologists may be used in various ways, depending on supply. There are little data assessing how neurologists currently spend their time. For example, board-certified active and retired neurologists are included in the same estimates of future need. Furthermore, time spent in academic activities or those not involving patient care is not assessed. It is not clear to what extent accurate projections of neurologic personnel needs can be made from the incidence of neurologic diseases alone. For example, a careful evaluation by neurologists of symptoms that do not ultimately reflect structural neurologic disease (for example, chronic fatigue or pain) is extremely helpful to patients and primary care physicians. These patients are not included in need projections if the projections are to be based solely on the known incidence of neurologic disease. Reliable projections will also depend on two additional unknown variables: the number of neurology residents who will be trained in the future, and the adequacy of neurologic training for primary care physicians.

It would be unfortunate if the role of neurologists in a new health care system were to be confined to consultation services only. The unique skills of neurologists place them in a useful position to provide emergency or continuing care of patients with neurologic diseases. Examples of the former include stroke and other acute neurologic catastrophes that require intensive in-hospital care. Examples of the latter include the participation of neurologists in team settings for the care of patients with chronic nervous system diseases including Alzheimer's disease, multiple sclerosis, Parkinson's disease, epilepsy, pain, and neuromuscular disorders. A rapid growth in the number of effective therapies for these disorders will further increase the appropriate role of neurologists in neurorehabilitation and other long-term-care settings. To thrive, the specialty will need to demonstrate the effects of its services on outcome and cost and to work effectively with primary care physicians in the managed care arena.

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